BELOSEVICH, V.K.

136-6-20/26

AUTHOR: Kalugin, V.F., Candidate of Technical Sciences.

TITLE: On the Article "Rolling and Heat Treatment of Titanium" by N.P. Zhetvin and V.K. Belosevich. (Po povodu stat'i N.P. Zhetvina i V.K. Belosevicha "Prokatka i Termicheskaya Obrabotka Titana".)

PERIODICAL: Tsvetnyye Metally, 1957, No.6, pp. 78-80 (USSR)

ABSTRACT: The writer of this letter to the editor is supervisor of the rolling group for the VIAM organisation. He strongly criticises recommendations and omissions in an article by Zhetvin and Belosevich published in Tsvetnye Metally, No.1. On the part "Production of Sections", he maintains the authors' suggestions for surface cleaning and heat treatment are misleading and gives a table of results obtained at his organisation on the mechanical properties of titanium after rolling with and without subsequent vacuum treatment. The misleading nature of the part "Hot Rolling of Sheets" he attributes to the authors' ignorance of practical work carried out elsewhere. The writer goes on to cite experimental data which showed the satisfactory plasticity of technical titanium when cold-rolled with stretching. The authors' recommendations on heat-treatment he considers incomprehensible, and because of omission of

Card 1/2 analyses, incapable of application to titanium-aluminium

On the Article "Rolling and Heat Treatment of Titanium" by N.P. Zhetvin and V.K. Belosevich.

alloys. Finally, he quotes experimental results obtained by N.A. Koshvheyeva and L.N. Kononenko at the Zaporozhstal' Works on the etching of titanium sheet and mentions that etching of titanium by the alkali-acid method was first adopted at the Elektrotsink Works with the participation of his organisation.

ASSOCIATION: VIAM

AVAILABLE: Library of Congress

Card 2/2

S/180/60/000/005/031/033
E111/E135

AUTHORS: Belosevich, V.K., and Pavlov, I.M. (Moscow)

TITLE: The Destruction of Metal under the Influence of a Technological Lubricant During Rolling

PERIODICAL: Izvestiya Akademii nauk SSSR.Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1960, No.5, pp 224-226

TEXT: It is pointed out that the influence of a technological lubricant on the process of cold rolling was investigated mainly from the point of view of its influence on the friction coefficient and the related problem of the thickness of sheets obtainable on a given rolling equipment. The lubricant can also have a strong influence on the quality of the surface of sheets. This is illustrated by examples of steel strip from steel СВ-08 (SV-08) rolled with castor and palm oil (Fig.1) and stearic acid (Fig.2a) and titanium strip rolled with natural wax (Fig.2б). It is considered that in addition to known phenomena of surface activity of the lubricant and the subsequent hydrostatic action of the lubricant squeezed into fissures, the destruction of strip can be caused by some specific phenomena in the focal point of deformation which, apparently, were not yet investigated.

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S/180/60/000/005/031/033
E111/E135

The Destruction of Metal under the Influence of a Technological Lubricant during Rolling

It is suggested that the tendency of the lubricant to be squeezed along the longitudinal axis can be compared with the tendency of more yielding layers of metal to an increased elongation. Thus, the action of the lubricant may not be limited to reducing the friction along the contact surfaces and penetration into the mass of the metal, but can also give an effect of stretching the surface layer of metal, due to the "deformation" of the lubricant itself, i.e. squeezing out. It is stressed that in many cases (e.g. rolling of titanium and its alloys) the destruction of metal, taking place exclusively due to the action of the lubricant can be mistakenly ascribed to a decrease in the plasticity of the metal. Therefore, the problem deserves more investigation. There are 2 figures and 7 references: 5 Soviet, 1 English and 1 German.

SUBMITTED: June 18, 1960

Card 2/2

15.6500 only 1583

S/509/60/000/007/014/014
E194/E483

AUTHORS: Pavlov, I.M., Belosevich, V.K. and Belousov, A.S.

TITLE: A Procedure for Assessing Wire Drawing Lubricants

PERIODICAL: Akademiya nauk SSSR. Institut metallurgii. Trudy, No.7. Moscow, 1960. pp.138-146. Metallurgiya metallovedeniye, fiziko-khimicheskiy metody issledovaniya

TEXT: This article describes a laboratory method of assessing wire drawing lubricants. The principal requirements applicable to wire drawing lubricants are first summarized. In the assessment the principal magnitudes measured were the wire drawing force and the amount of lubricant on the wire surface after drawing. The quality of the wire surface was assessed in certain cases. The tests were made on a laboratory drawbench at speed of 15 m per min. The wire drawing forces were measured with a spring dynamometer fitted with strain gauges, the outputs of which were applied through an amplifier to an oscillograph. The lubricant thickness on the surface was determined by taking samples after each draw weighing, washing with benzene and reweighing. The quality of the surface was assessed visually by examination

Card 1/9

through a lens with a magnification of x5 and in some cases a profilograph type MC-18 (IS-18) with diamond stylus was used. It was difficult to obtain uniform raw material in large quantities. For each series of tests the wire was taken from a single melt or even from a single coil. Steel of grades 08 - 10 was annealed, etched and limed. Some of the wire was tested without liming. Steel grade 50 was copper plated and covered with a layer of liquid glass. Stainless steels 1Kh18N9 (1Kh18N9) and 2Kh18N9 (2Kh18N9) were annealed (hardened) and etched and then coated with lime and salt. So far the procedure was much the same as used in practice at the "Serp i molot" works. The materials were dried before the tests. The dried lubricants were milled and sieved. The die geometry was the same in all cases, the half angle of the inlet cone being 6°30' and the length of cylindrical part $\ell = d/2$. All the dies were made of hard alloy type VK8 (VK8). The method of finishing the dies is explained. The initial length of the wire samples was about 10 m. Both solid and liquid lubricants were applied by normal methods. The wire drawing force was measured oscillographically at ten points at intervals of

about 1.5 sec, thus giving the mean force used in calculations of the coefficient of friction. The wire drawing force itself should not be used to assess the quality of the lubricant, it is better to use the coefficient of friction, formulae for the calculation of which have been given by other authors. In view of the cone geometry used, the coefficient of friction was calculated from the following simplified formula

$$\frac{k}{p} = 2\mu_{тр} \cdot \left(\frac{f}{F}\right)^a + \frac{b}{a}\left[1 - \left(\frac{f}{F}\right)^a\right] + 0{,}7698\left(0{,}1139 + \frac{\mu_{тр}}{2}\right),$$

where μ_{Tp} - the coefficient of friction; k - the specific wire drawing stress; p - the mean resistance to strain; F - the cross-section of the area before drawing; f - the cross-sectional area after drawing;

$$a = \left(\frac{1}{\cos\frac{\alpha}{2}} + \frac{\mu}{\operatorname{tg}\alpha \cdot \cos\frac{\alpha}{2}} - 1\right);$$

$$b = \left(\frac{1}{\cos\frac{\alpha}{2}} + \frac{\mu}{\operatorname{tg}\alpha \cdot \cos\frac{\alpha}{2}}\right).$$

For different values, curves of the following type may be constructed: $k/p = \Psi(\mu_{Tp})$. In practice, the value of k may be determined from the mean wire drawing stress and p may be taken as the mean of σ_o and σ_1. In each particular case the coefficient of friction is determined from the calculated value of k/p. The amount of lubricant on the surface was expressed in mg/cm^2. It was difficult to calculate the mean thickness because the specific gravity of the lubricant layer which includes the lubricant and wear products in indeterminate condition could not be determined. In addition, determinations were made of variations in wire drawing stress $(K_{max} - K_{min}) / K_{average} \times 100\%$. Fig.3 shows typical graphs of the change in the amount of lubricant on the surface and of the coefficient of friction with increasing number of passes. The tests relate to steel lubricated with soap powder, the upper graph gives the quantity of lubricant on the surface in mg/cm^2 and the lower graph the coefficient of friction (note that rough scratches are formed after the seventh pass). So long as there is plenty of lubricant the surface of the wire is matt and profilograms of the surface give differences of about

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5 microns between the peaks and values. There are no scratches or scorings. When the amount of lubricant has become reduced, the friction usually varies little but there is a marked change in the surface finish, there may be sometimes one or two more passes without scoring or heavy scratches but with bad lubricants scratching occurs at once. As soon as scoring has commenced, the amount of lubricant varies widely and the wire drawing stresses and coefficient of friction increase, as does the variation in wire drawing effort. The values obtained with some of the lubricants when drawing steel are tabulated. It is evident that there is no direct relationship between the coefficient of friction and the stability of lubricant assessed by the number of passes. Certain changes in the coefficient of friction when the quantity of lubricant is markedly reduced shows that it is impossible to judge of the mechanism of friction from the absolute value of the coefficient of friction as certain authors do. Still less is it justified to assert that when the coefficient of friction is less than 0.05, the friction in wire drawing is of hydrodynamic type. The fact that after the layer of lubricant has become thin, with

most lubricants scratches are observed which are later converted to deep scoring indicates that in assessing the quality of wire drawing lubricant it is important to note the number of passes for the lubricant layer becomes too thin. The number of passes without heavy scratches and scoring in the presence of a thin layer of lubricant is also very important in assessing the lubricant. I.L.Perlin and S.I.Gubkin are mentioned for their contribution in this field. There are 5 figures, 1 table and 10 references: 6 Soviet-bloc and 4 non-Soviet-bloc. The two references to English language publications read as follows: R.Tourett. Wire and Wire Products. III, 30, No.3. 1955; W.M.Halliday. Wire Industry, XII, 24, No.228, 1957.

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PAVLOV, I.M.; BELOSEVICH, V.K.; BELOUSOV, A.S.

Methods of evaluating lubricants in drawing. Trudy Inst. met. no.7:138-146 '60. (MIRA 14:3)
(Drawing(Metalwork)) (Metalworking lubricants)

22804

1.1300 also 1496, 1454

S/136/61/000/005/007/008
E111/E152

AUTHORS: Pavlov, I.M., and Belosevich, V.K.

TITLE: Investigation of lubricants for cold rolling titanium

PERIODICAL: Tsvetnyye metally, 1961, No.5, pp. 65-69

TEXT: In the work described the rolling of grade BT-1 (VT-1T) titanium and 08KP (08KP) (rimming) steel using about 30 widely-used lubricants and others, was studied. In a subsidiary series of experiments a further material, Cr.50 (St.50) steel was used. In selecting the lubricants, results of drawing experiments in collaboration with A.S. Belousov of the "Serp i Molot" works were taken into consideration. The annealed and pickled titanium had a tensile strength of 58-60 kg/mm^2, elongation of 21-23% and Rockwell B hardness of 89-93; the corresponding figures for the steel were 35, 29-30 and 40-43. The initial thickness of both materials was 1.2 mm, thin enough to show lubricating effects clearly (Refs. 1, 2); the initial width (30 mm) was such that rolling could be effected at high pressures and degrees of reduction without width being an important factor in spread (Ref.6). A two-high mill with 220-mm diameter rolls of [illegible]-15 (ShKh-15)

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Investigation of lubricants for cold ...

steel (Rockwell C hardness after hardening and low-temperature annealing 63-64) was used, rolling speed being 0.53 m/sec and roll pressure and torque being measured. The steel was rolled in four passes, the titanium in five, the roll-setting for a given pass number being constant for all lubricants. The qualitative influence of lubricants was best represented, in the authors' opinion, by the ratio of overall reduction to final thickness. The results per pass qualitatively coincided with the overall results and the latter therefore provide a better criterion for lubricants since the lubricant influence is summated while random variations become relatively less important. The order of effectiveness of the tested lubricants was found to be the same for the titanium and the 08KP steel. The most effective for cold rolling titanium were natural fats and high-molecular saturated aliphatic acids, and also some commercially available synthetic materials (e.g. oil number 142) whose cheapness makes them additionally attractive. Natural wax was outstandingly effective. Number 142 and an ultrasonic emulsion of a high paraffin content oil ("gach") should be tested under industrial conditions. The emulsion has the advantage of being also an effective coolant.

22804

S/136/61/000/005/007/008
E111/E152

Investigation of lubricants for cold...

cooling being an important factor in titanium rolling. The authors recommend water-cooling of rolls on the outlet side, as for steel strip (Ref.9), or internal roll cooling. No hydrogen pick-up by titanium from lubricant decomposition products during annealing need be feared (Ref.10). Using effective lubricants, reduction of titanium in cold rolling can be increased by 30-40%, the number of passes required being almost halved compared with that when mineral oils are used. The subsidiary experiments on St.50 steel, carried out in collaboration with I.A. Chamin and I.K. Tokar' of TsNIIChM, on an 180/370 x 400 four-high mill, confirmed the main results. The present investigation represents a further contribution by Pavlov to previous work in this field (Refs. 1, 2).
There are 1 figure, 3 tables and 10 references: 8 Soviet and 2 English. The English language references read:
Ref.4: E. Rabinowicz, E.P. Kingsbury, Lubricants for titanium, Metal Progr. 1955, 67, No.5, pp. 112-114.
Ref.9: I.C. Whetzel, Rodman Sayre, Improved lubrication in cold strip rolling. Iron and Eng., 1959, 36, pp. 123-132.

Card 3/3

21159
S/032/61/027/004/019/028
B103/B201

15.6000 1583 only

AUTHORS: Pavlov, I. M., Belosevich, V. K., and Ushakov, Ye. V.

TITLE: Device for studying the external friction in the plastic deformation of metals

PERIODICAL: Zavodskaya laboratoriya, v. 27, no. 4, 1961, 462-463

TEXT: The apparatus described here is suited for measuring the frictional force at high pressures and rubbing speeds arising in the pressure treatment of metals. The authors achieved their purpose by making use of a flywheel. They state that the effect of speed and pressure upon the coefficient of friction is often difficult to be studied. In devices known so far, samples have been shifted by hand over deforming plates in the process of plastic deformation. The consequence has been a strongly fluctuating rubbing speed which did not exceed 0.05 m/sec. In the authors' device (Fig. 1), samples are shifted by a mechanical system. Sample 1 is compressed by plane-parallel plates in a hydraulic 30-ton press. The parallel position of the working planes is ensured by guides 2, in which punches 3 move. Rubber shock absorbers 4 ensure a constant pressure

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on the sample. Inside the deforming device, the sample is shifted by means of an elastic fork 6. The sample is altogether prevented from bending. Fork 6 is fastened onto bar 7 which moves in guide 8 and which carries a pressure cell which records the sample resistance to shift, viz. the frictional force. Bar 7 is put into motion by the already turning flywheel 9. The mobile end of bar 10 is connected to armature 13 of electromagnet 14 via 11 and 12, and, when 14 is switched on, it is lowered to the position indicated by a dashed line. Striker 15 of the flywheel shifts bar 7 so far ahead that the sample is pushed out of its position between the plates. Flywheel 9 is driven by friction step pulley 16 which is fixed to shaft 17 of a weighted rocking lever 18. Wheel 16 is pressed onto flywheel 9 by the weight. Shaft 17 is driven by an electric motor. By means of this mechanism the sample can be shifted at a rate of up to 4 m/sec. Fig. 2 presents the device serving to produce lower speeds (0.05-0.6 m/sec). The bent lever 1 has a shoe 2 which is pressed onto eccentric 3. The mechanism is inserted into the position indicated by the solid line by folding of 2. The rough adjustment is done by means of step pulley 16 (Fig. 1), the fine adjustment by a partial braking of flywheel 9. The frictional forces are recorded

Device for studying the external ...

by a wire strain gauge as well as by an amplifying recording apparatus (МПО-2 (MPO-2) oscilloscope and tensometric electronic amplifier). The apparatus is used to study the dependence of frictional forces on the rubbing speed, on pressure, and other factors. Fig. 3 presents, as an example, the coefficient of friction as a function of the relative rubbing speed of aluminum on a hardened steel surface (type ШХ 15 (ShKh15)) with castor oil as a lubricant, and at constant pressure (14.1-13.5 kg/mm^2). There are 3 figures and 3 Soviet-bloc references.

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR (Institute of Metallurgy imeni A. A. Baykov of the Academy of Sciences USSR)

21159

S/032/61/027/004/013/028
B103/B201

Device for studying the external ...

Legend to Figs. 1 and 2: see the text.

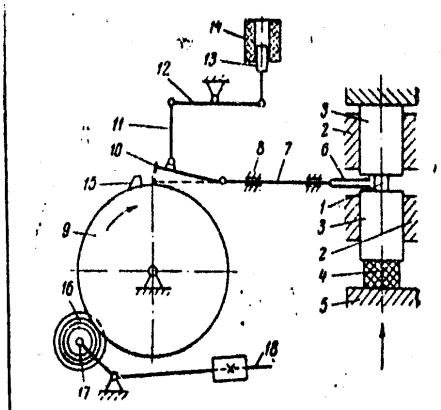

Рис. 1. Схема установки для исследова-

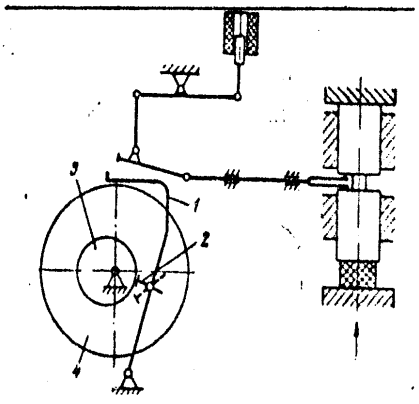

Рис. 2. Схема механизма для получения малых скоростей скольжения (0,05—0,8 *м/сек*)

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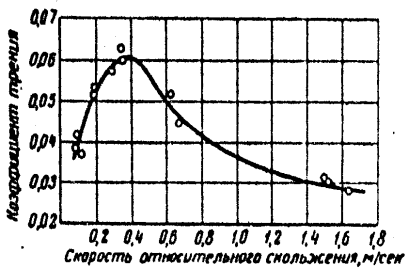
S/032/61/027/004/019/020
B103/B201

Device for studying the external ...

Legend to Fig. 3: Abscissae: rate m/sec, ordinates: coefficient of friction.



Card 5/5

BELOSEVICH, V. K., Cand. Tech. Sci. "Investigation of Friction in Plastic Deformation of Metals," Moscow, 1961, 15 p (Moscow Steel Inst.) 120 copies (KL Supp 12-61, 263).

PAVLOV, I.M.; BELOSEVICH, V.K.

Negative leading during the rolling process. Izv. vys. ucheb. zav.; chern. met. 4 no.10:46-49 '61. (MIRA 14:11)

1. Institut metallurgii im. Baykova.
(Rolling (Metalwork))

PAVLOV, I.M.; BELOSEVICH, V.K.

Investigating industrial lubricants for the cold rolling of titanium.
TSvet. met. 34 no.5:65-69 My '61. (MIRA 14:5)
(Metalworking lubricants) (Titanium--Cold working)

S/137/62/000/010/006/028
A052/A101

AUTHORS: Afanas'yev, I. D., Dobkin, I. Ye., Sazanova, M. N., Soltan, S. O., Garzanov, G. Ye., Tokar', I. K., Chamin, I. A., Belosevich, V. K., Pavlov, I. M.

TITLE: The effect of substances with a lower surface tension in the composition of synthetic lubricants on the cold rolling of thin metal strips

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 10, 1962, 8, abstract 10D46 ("Novosti neft. i gaz. tekhn. Neftepererabotka i neftekhimiya", no. 4, 1962, 23 - 27)

TEXT: The data on the effect of various technological lubricants on the cold rolling of strips on a two- and four-high mill are cited. Synthetic greases, - esters of saturated synthetic fatty acids, - reduce the friction and the resistance of metal to deformation at rolling of carbon steel and Ti (BT-1-T) (VT-1-T) strips more effectively than animal fat, palm oil, mineral oils etc. Synthetic lubricants, due to their low costs and good lubricating quality, should be reco mended for an extensive testing on cold rolling mills.

Card 1/

N. Yudina

(Abstracter's note: complete translation)

PAVLOV, I.M.; BELOSEVICH, V.K.; Prinimali uchastiye: USHAKOV, Ye.V., inzh.; KOZLOV, V.S., laborant

Investigating the relationship between the friction coefficient and speed and pressure on a special unit. Trudy Inst.met. no.9:139-146 '62. (MIRA 16:5)

(Friction)

38702
S/598/62/000/007/029/040
D217/D307

AUTHORS: Pavlov, I. M., Belosevich, V. K. and Chamin, Yu. A.

TITLE: Cold rolling of commercially pure titanium as compared with rolling of steel and aluminum

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. no. 7, Moscow, 1962. Metallokhimiya i novyye splavy, 213-218

TEXT: Commercially pure titanium ВТ1Т (VTIT), steel 08КП (08KP) and aluminum А (A) were used in this study. The lubricants used were vegetable and animal fats, synthetic products of similar composition (nos. 142, 151), and mineral oils, both in the pure state and with additions (paste ЭЛ (598)). The influence of standard lubricants on the parameters of rolling in passes with fixed roll positions is discussed. The authors recommend new synthetic lubricants of the complex ether type for cold-rolling of Ti. Their use enables the number of passes or the number of intermediate annealing processes to be reduced, whilst retaining

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S/598/62/000/007/029/040
D217/D307

Cold rolling of ...

the properties of the metal. Cold-rolling of technically pure Ti with a total reduction of up to 50% is possible, which enables sheet in the cold worked condition to be manufactured, as in the case of stainless steel. The surface quality of Ti sheet produced by a given set of rolls can be regulated by the use of various lubricants. There are 3 figures and 2 tables.

Card 2/2

37691
S/509/62/000/009/010/014
D207/D308

15.6700 (4409)

AUTHORS: Pavlov, I. M., Belosevich, V. K. and Chamin, Yu. A.

TITLE: Investigating the effect of technical lubrication on the cold rolling of titanium

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Trudy, no. 9, Moscow, 1962. Voprosy plasticheskoy deformatsii metalla, 147-158

TEXT: Commercial titanium ST-1 (VT-1) and steel 08KP (08KP), both of 1.2 mm thickness, were cold-rolled using one of 30 lubricants of the following types: vegetable oils, animal fats, surface-active agents, mineral oils of various viscosities and purities, mineral oils with surface-active additives, and complex synthetic esters. It was found that the lubricants suitable for steel were also suitable for titanium. The most effective lubricants for cold rolling of titanium were natural animal fats, high-molecular saturated fatty acids, and complex syntnetic esters. Some vegetable oils and emulsions used in ultrasonic machining were also recom-

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mended. Surface-active agents do not always determine the effectiveness of a lubricant, but their presence reduces adhesion between titanium and the rolls. Deterioration of mechanical properties of titanium, due to possible hydrogenation, was not observed. The standard methods of applying the lubricant in the case of steel were also suitable for titanium. The best lubricants gave a 30 - 40% increase of the deformation per single pass compared with dry rolling, and the number of passes could be reduced by half compared with rolling using 59C (59S) paste. There are 5 figures and 3 tables.

Card 2/2

PAVLOV, I.M.; BELOSEVICH, V.K.

Relationship between the friction coefficient during upsetting and the sliding track, and the role of surface-active substances in lubrication. Trudy Inst.met. no.9:202-208 '62. (MIRA 16:5)
(Forging) (Lubrication and lubricants)

PAVLOV, I.M.; BELOSEVICH, V.K.

Value of the friction coefficient during cold rolling. [illegible]
met. no.9:209-213 '62. (MIRA 16:1)
(Rolling (Metalwork))

ACCESSION NR: AT4014064 S/3072/63/000/000/0097/0101

AUTHOR: Chamin, I. A.; Belosevich, V. K.; Chamin, Yu. A.; Shakhov, V. L.; Pavlov, I. M.; Pedos, I. F.

TITLE: Extract from an article on lubrication in cold sheet rolling

SOURCE: Fiz.-khim. zakonomernosti deystviya smazok pri obrabotke metallov davleniyem. Moscow, Izd-vo AN SSSR, 1963, beginning with "V SSSR na neskol'ky*kh..." on page 97 through page 101

TOPIC TAGS: cold rolling lubricant, cold rolling, lubricant, palm oil substitute, mineral oil, animal fat, vegetable fat, castor oil

ABSTRACT: In several Soviet plants investigations have been made on replacement of palm oil as lubricant in sheet rolling by domestic substitutes on the basis of vegetable and animal fats, and by lubricants on the basis of synthetic fatty acids. In one plant, the standard mineral emulsion B has been used on the rolling mill 220/600 x 650 for cold sheet rolling. On the basis of the investigations, the mineral emulsion has been replaced by more efficient technological lubricants. Palm oil, castor oil, and beef tallow were investigated. In another case, palm oil, artificial solid fat (Salomas, obtained as the result of action of chemical compounds from oils), and castor oil have been tried and compared as lubricants on the continuous

Cardd 1/3

ACCESSION NR: AT4014064

rolling mill 244/600 x 650. Positive results have been obtained, resulting in a production rise of 30-40%. Similar experiments have been conducted on the four-high reversive rolling mill 180/600 x 650 for stainless steel 1 Kh 18N9T (Ya/II) cold strip rolling. In this case, water based mineral oil emulsion, B-106 stearin, B-99 table fat, and beef tallow have been used as technological lubricants. The conclusion has been made that, by applying effective lubricants, the manufacturing cycle of thin stainless strips will be considerably reduced by reducing the number of heat treatment and pickling operations. However, because of scarcity of fats of organic origin, further development has been directed toward finding synthetic compounds structurally similar to animal fats. During trial runs of a five-unit rolling mill 1200, lubricants on the base of vegetable fats have been tried out and compared with palm oil. 9000 tons of sheet, 98% of acceptable quality, have been rolled on castor oil at a specific oil consumption of 2.8 kg/ton. More than 6000 tons have been rolled on artificial solid fat. During these tests, castor oil has been the most effective lubricant, requiring the least power. Processes of annealing, descaling, pickling, and tinning have not created difficulties during manufacture of strips, and the quality of sheet has not been impaired by the lubricant. With regard to the search for new synthetic technological lubricants in cold rolling, a substantial disadvantage exists: the lack of emulsions which are inexpensive and more efficient

ACCESSION NR: AT4014064

than such of mineral oils. From the given review it has been concluded that addition of fats to mineral emulsions has only a slight if any improving effect on the lubricating properties; and that emulsions on the basis of fats or their equivalent substitutes are either expensive or are unstable and insufficiently effective. Orig. art. has: 4 tables.

ASSOCIATION: none

SUBMITTED: 00	DATE ACQ: 19Dec64	ENCL: 00
SUB CODE: MM, IE	NO REF SOV: 007	OTHER: 008

Card 3/3

ACCESSION NR: AT4014065 S/3072/63/000/000/0102/0109

AUTHOR: Belosevich, V. K.; Chamin, Yu. A.; Shakhov, V. L.; Soltan, S. G.; Sazanov, M. A.; Chamin, I. A.

TITLE: Investigation of the properties of various complex esters as technological lubricants for the cold rolling of carbon and special steels

SOURCE: Fiz.-khim. zakonomernosti deystviya smazok pri obrabotke metallov davleniyem. Moscow, Izd-vo AN SSSR, 1963, 102-109

TOPIC TAGS: lubricant, cold rolling, steel, complex ester, petrolatum, carbon steel, steel rolling

ABSTRACT: The effect of the structure of some synthetic esters upon their effectiveness as lubricants for the cold rolling of 08KP, 33A 1Kh18N9T, and VG98 steel has been investigated. The effectiveness of the lubricant was evaluated on the basis of measurements during several rolling operations with constant adjustment of the rollers. Thus, the distance of the top roller was reduced after each operation to provide constant pressure. There was found to be a direct linear relationship between band thickness and the pressure of the metal on the roller. The

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ACCESSION NR: AT4014065

effectiveness of various tested esters and natural oils is shown in Figure 1 of the Enclosure. Similar curves were obtained for various hydrocarbon lubricants and mixtures of technical petrolatum with the triethyleneglycol esters of the C17-C21 acids. It is concluded that the effectiveness of an ester increases proportionally with the length of the molecule. The type of alcohol and length of its molecule do not affect the lubrication properties of the ester, but do affect the melting point. Branches, chains and cyclic groups decrease the lubrication effectiveness of the esters. The presence of oleic acid in the lubricant increases the antiscratching property of the lubricant. The most effective esters proved to be those from the dibasic alcohols and the synthetic C17-C21 fatty acids containing antiscratching admixtures The butyl ester of stearic acid was better than palm oil, while the technological properties of the simple hydrocarbons were worse than those of palm oil. The friction coefficient of any lubricant may be increased by dilution with a less effective one. "The work was carried out under the direction of I. M. Pavlov, corr. member of the AN SSSR." Orig. art. has: 6 figures and 2 tables.

ACCESSION NR: AT4014065

ASSOCIATION: None

SUBMITTED: 00	DATE ACQ: 19Dec63	ENCL: 01
SUB CODE: MM	NO REF SOV: 007	OTHER: 001

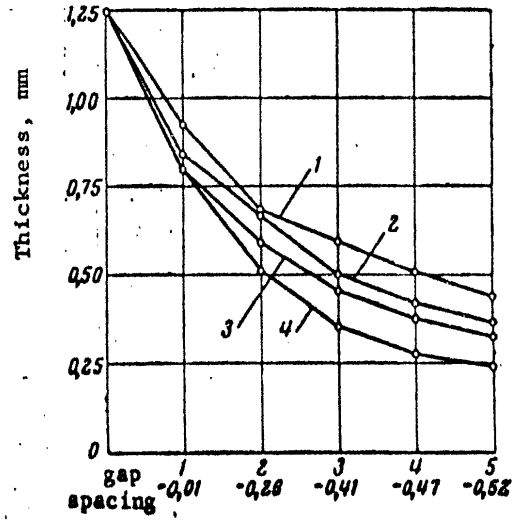
Card 1/4

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204400013-6

ACCESSION NR: AT4014065

ENCLOSURE: 01

Effectiveness of various complex esters and natural fats (steel 08KP):



Card 4/4

BELOSHABSKAYA, YE. I.

GERDOV, M.A., doktor tekhn.nauk; BELOSHABSKAYA, Ye.I.; GRIGOR'YEVA, T.V.

Nature of the distribution of packing material fed by compressed air into an inclined opening. Podzem.gaz.ugl. no.3:43-45 '57.
(MIRA 10:11)

1. Institut gornogo dela Akademii nauk SSSR.
(Coal gasification, Underground)

BELOSABSKI, V. I.[Beloshabskiy, B. I.]; STEINER, A. L.[Shteyner, A. I.]

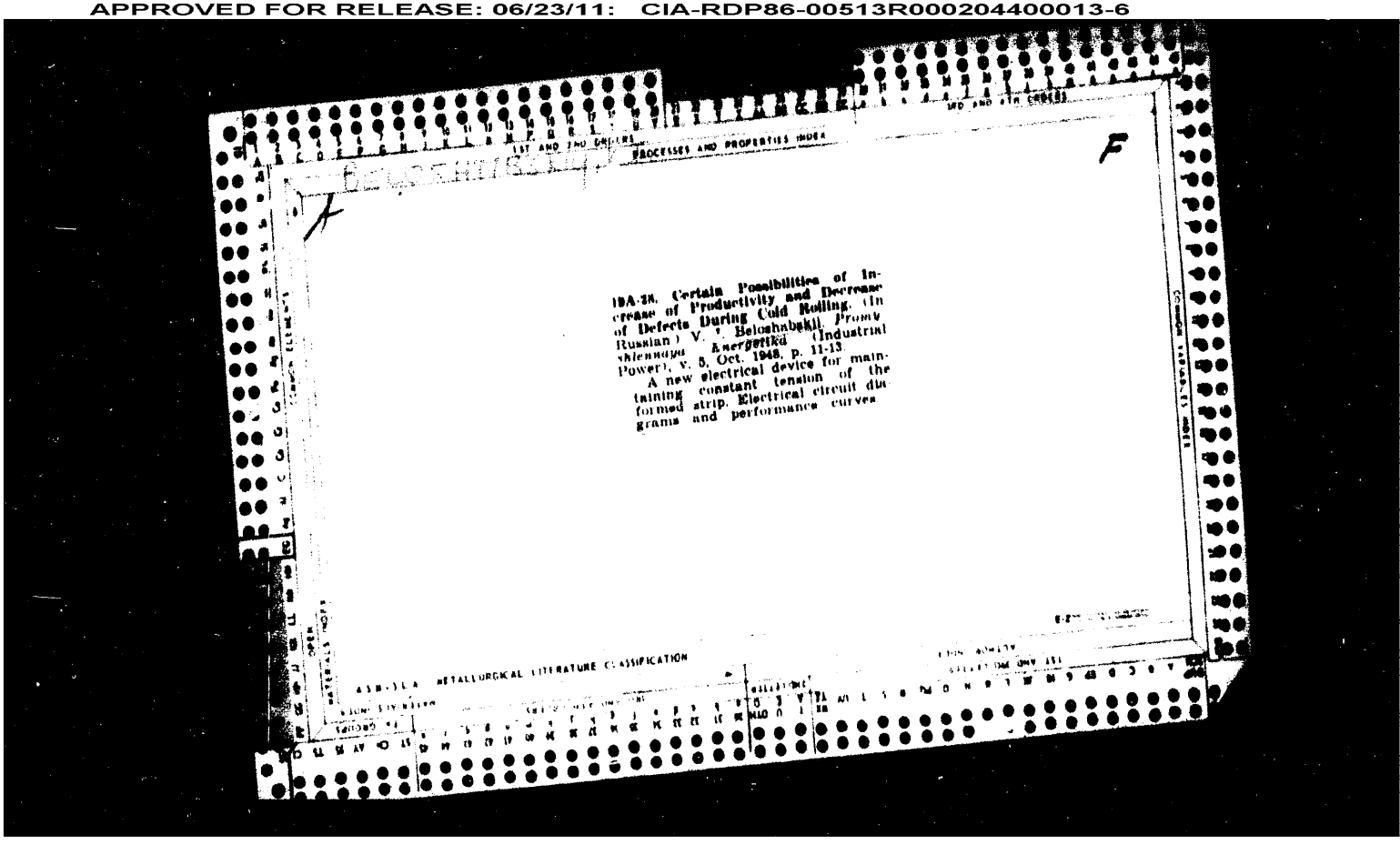
Automatic control of the speed of ladle slope in cast iron teeming.
Analele metalurgie 15 no.4:189-194 O-D '61.

(Cast iron) (Dippers) (Automation)

PINCHUK, I.S.; BELOSHABSKIY, V.I.; RANNEV, G.G.; SHTEYNER, A.L.; GUSACH, V.Ya.

Automatic pouring of cast iron by blast furnace pouring machines. [Sbor. trud.] Nauch.-issl.inst.met. no.4:164-167 '61. (MIRA 15:11)

1. Nauchno-issledovatel'skiy institut metallurgii (for Pinchuk, Beloshabskiy, Rannev, Shteyner). 2. Chelyabinskiy metallurgicheskiy zavod (for Gusach).
(Blast furnaces--Equipment and supplies)



S/130/61/000/005/002/005
A006/A101

AUTHORS: Beloshabskiy, V. I., Shteyner, A. L.

TITLE: Automatic control of the speed of ladle tilting when teeming cast iron

PERIODICAL: Metallurg, no. 5, 1961, 10 - 12

TEXT: In spite of several attempts to automate the teeming of cast iron in blast furnace shops, this process is still conducted manually. This is probably due to the fact that the true filling of the mold with cast iron was not controlled and that the pulses for speed change of the tilting-winch motor were supplied depending on the geometrical position of the ladle or as a function of time. A method is proposed of controlling the speed of ladle tilting, depending on the filling of the mold during teeming process, using a chromel-alumel thermocouple as a filling indicator. The thermocouple is connected with an automatic potentiometer and a proportional-plus-integral controller which, through a servomechanism, regulates the resistance controlling the current in the winding circuit control of the magnetic amplifiers. The amplifiers feed the excitation winding of the generator of the tilting winch motor. If the metal in the molds is

Automatic control of the speed ...

below the required level, the thermo emf of the thermocouple decreases and causes the shifting of the pick-up slider of the potentiometer resistance. The pulse is supplied switching-on the servomechanism to increase the resistance in the demagnetization winding circuit controlling the magnetic amplifiers. The generator voltage increases and accelerates the motor of the tilting winch. Speeded-up tilting of the ladle will raise the cast-iron level in the molds until the required amount. If the metal level in the mold is too high, the automatic control system reduces the speed of the ladle tilting. Overflow is controlled by a photorelay. The new method was tested at the Scientific Research Institute of Metallurgy in the Chelyabinsk sovnarkhoz and brought into use at the Chelyabinsk Metallurgical Plant. The system was operating reliably maintaining the cast iron level in the molds with up to 5% accuracy. Teeming speed was raised by 10.3%, and losses of cast iron on the cones were reduced. The new method is a means for the comprehensive automation of teeming machines. There are 5 figures.

Card 2/2

BELOSHAPSKIY, V.I., Kand.tekhn.nauk; [illegible], Ye.V., Kand.tekhn.nauk

Continuous measurement of metal level in casting molds during steel teeming. Biul.tekh.-ekon.inform.Gos.nauch.-issl.inst. nauch.i tekh.inform. 16 no.10:3-5 '63. (MIRA 16:11)

Belashapka, I

PHASE I BOOK EXPLOITATION SOV/4380

Zavod imeni Dzerzhinskogo, Dneprodzerzhinsk

Metallurgi v bor'be za tekhnicheskiy progress (Metallurgists in the Fight for Technical Progress) [Moscow] Izd-vo VTsSPS Profizdat 1959 56 p. 3,000 copies printed.

Special Eds.: Ye. V. Kochinev, F.M. Novikova, and I.B. Polyak; Ed.: E.A. Makarova; Tech. Ed.: N.D. Shadrina.

PURPOSE: This book is intended for technical personnel interested in metallurgical processes.

COVERAGE: The book contains 9 articles dealing with technical improvements developed and implemented by members at the Plant imeni Dzerzhinskiy, Dneprodzerzhinsk, of the Nauchno-tekhnicheskoye obshchestvo chernoy metallurgii (Scientific and Technical Society for Ferrous Metallurgy). Individual articles discuss techniques in limestone kilning, blast-furnace charges, intensification of open-hearth processes, ingot rolling, and improvements in rail production.

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Metallurgists in the Fight for Technical Progress SOV/4380

No personalities are mentioned. There are no references.

TABLE OF CONTENTS:

Metallurgists in the Fight for Technical Progress SOV/4380

AVAILABLE: Library of Congress (TN705.Z3)

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AC/dwm/mas
11-15-60

BELOSHAPKA, I.S., inzh.

Improving working conditions in a blast-furnace plant. Bezop.truda v prom. 5 no.12:28-29 D '61. (MIRA 15:1)

1. Metallurgicheskiy zavod im. F.E.Dzerzhinskogo.
(Blast furnaces--Equipment and supplies)

SADOKOV, G.M.; BELOSHAPKA, M.V.; BIBA, V.I.

Piercing machine mandrel with cooling of the external surface of the cone. Biul.TSIICHM no.4:52 '61. (MIRA 14:10)
(Rolling mills--Equipment and supplies)

BELOSHAPKIN, D.; SMIRNOV, V.

West German monopolies in the Near and Middle East. Vnesh. torg. 40 no.12:16-20 '60. (MIRA 13:12)
(Near East--Investments, West German)

BELOSHAPKIN, D.F.

Specialization of the light industry enterprises. Tekst.prom. 22 no.11:5-8 N '62. (MIRA 15:11)

1. Glavnyy spetsialist Soveta po koordinatsii i planirovaniyu raboty soveta narodnogo khozyaystva Zapadnogo ukrupnennogo ekonomicheskogo rayona.
(Industrial management)

BELOSHAPKIN, D.F.

Foreign practices for the processing of synthetic fibers (from "Wirkerei und Strickerei technik, "nos 5,6,7, 1958). Tekst. prom. 19 no.11:85-87 N '59. (MIRA 13:2)

1.Glavnyy spetsialist po tekstil'noy, trikotazhnoy i shveynoy promyshlennosti Gosudarstvennogo nauchno-tekhnicheskogo komiteta Soveta Ministra Kirgizskoy SSR.

(Textile fibers, Synthetic)

SPANDAR'YAN, V.B., red.; KUTSENKOV, A.A.; YERSHOV, Yu.A.; PIROZHKOVA, A.G.; ZINOV'YEV, N.V.; GOLOVIN, Yu.M.; BELOSHAPKIN, D.K.; KOROVINA, A.N.; MOISEYEV, P.P.; GASHEV, B.M.; YEZHOV, L.S.; MANENOK, A.I.; ROGOV, V.V.; GORYUNOV, V.P., red.; INOZEMTSEV, N.N., red.; SHLENSKAYA, V.A., red. izd-va; BORISOVA, L.M., red. izd-va; VOLKOVA, Ye.D., tekhn. red.

[Foreign commerce of the U.S.S.R. with countries of Asia, Africa and Latin America] Vneshniaia torgovlia SSSR so stranami Azii, Afriki i Latinskoi Ameriki. Moskva, Vneshtorgizdat, 1958. 194 p. (MIRA 11:7)

1. Moscow. Nauchno-issledovatel'skiy kon"yunkturnyy institut. (Russia--Commerce)

KAPELINSKIY, Yu.N.; POLYANIN, D.V.; ZOTOV, G.M.; IVANOV, I.D.; SERGEYEV, Yu.A.; MENZHINSKIY, Ye.A.; KOSTYUKHIN, D.I.; DUDUKIN, A.N.; IVANOV, A.S.; FINOGENOV, V.P.; ZAKHMATOV, M.I.; SOLODKIN, R.G.; DUSHEN'KIN, V.N.; BOGDANOV, O.S.; SEROVA, L.V.; GONCHAROV, A.N.; LYUBSKIY, M.S.; PUCHIK, Ye.P. [deceased]; KAMENSKIY, N.N.; SABEL'NIKOV, L.V.; GERCHIKOVA, I.N.; FEDOROV, B.A.; KARAVAYEV, A.P.; KARPOV, L.N.; VARTUMYAN, E.L.; SHIPOV, Yu.P.; ROGOV, V.V.; BOGDANOV, I.I.; VLADIMIRSKIY, L.A.; LEBEDEV, B.I.; ANAN'YEV, P.G.; TRINICH, F.A.; GOLOVIN, Yu.M.; MATYUKHIN, I.S.; SEYFUL'MULYUKOV, A.M.; SHIL'DKRUT, V.A.; ALEKSEYEV, A.F.; BORISENKO, A.P.; CHURAKOV, V.P.; SHASTITKO, V.M.; GERUS, V.G.; ORLOV, N.V., red.; KAPELINSKIY, Yu.N., red.; GORYUNOV, V.P., red. V redaktirovanii prinimali uchastiye: BELOSHAPKIN, D.K., red.; GEORGIYEV, Ye.S., red.; KOSAREV, Ye.A., red.; PANKIN, M.S., red.; PICHUGIN, B.M., red.; SHKARENKOV, Yu.S., red.; MAKAROV, V., red.; BORISOVA, K., red.; CHEPELEVA, O., tekhn.red.

[The economy of capitalistic countries in 1958] Ekonomika kapitalisticheskikh stran v 1958 godu. Pod red. N.V.Orlova, IU.N.Kapelinskogo, V.P.Goriunova. Moskva, Izd-vo sotsial'no-ekon.lit-ry, 1959. 609 p. (MIRA 12:12)

1. Moscow. Nauchno-issledovatel'skiy kon"yunkturnyy institut. (Economic conditions)

SHLENKIN, O.G., starshiy prepodavatel'; BELOSHAPKIN, G.V., tekhnik-energetik

Experimental studies of the thermal insulation properties of vibrated brick slabs. Sbor. nauch. trud. TISI 8:21-30 '61. (MIRA 15:1)

1. Tomskiy inzhenerno-stroitel'nyy institut, kafedra "Tekhnologiya metallov i teploenergetika".

(Brick walls)

Beloshapkin, V.G.

130-12-17/24

AUTHORS: Kokarev, N.I., Candidate of Technical Sciences, Lisiyenko, V.G., Goncharevskiy, Ya.A., and Beloshapkin, V.G., Engineers.

TITLE: Industrial Testing of Open-hearth Ports with Ejection of Hot Air (Promyshlennoye ispytaniye golovok martenovskikh pechey s ezhektsiyey goryachego vozdukha)

PERIODICAL: Metallurg, 1957, Vol.2, No.12, pp. 28 - 29 (USSR).

ABSTRACT: Recalling that 3-10% decrease in tap-to-tap time and 4-16% decrease in fuel consumption had been obtained in 1953 at Magnitogorsk by ejecting cold atmosphere air into the gas ports, the authors describe more recent developments on the ejection of hot air. The idea of the new type of end (Fig.1) was due to the Ural Polytechnical Institute (Ural'skiy politekhnicheskiy institut) and provides for better distribution of combustion products between the gas and air checkers (a by-pass channel being provided), as well as increased gas velocity. The characteristics of the design were studied with models, the results also explaining the comparatively low effectiveness of cold-air ejection at the works. The new ends were incorporated in a 380-ton furnace at the Magnitogorsk Metallurgical Combine (Magnitogorskiy metallurgicheskiy kombinat), fired on mixed (coke-oven and blast-furnace) gas and provided with a magnesite-chromite roof. The bottom area was 73.7 m^2, the volume of the

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Industrial Testing of Open-hearth Ports with Ejection of Hot Air

air and gas checkers being 160 and 93 m^3, respectively. The cross-section of the by-pass channels was 400 x 560 mm, the port opening being decreased. Tar nozzles were located at the gas slag-pocket ends. Studies of the temperature distribution were made (Fig.2) under various conditions and durations of the various periods of the process were measured. With compressed air at 2 atm. gauge, the efficiency of combustion improved and more even re-generator temperatures were obtained. A number of design defects were found: difficulty of inspection and clearing of the bottom of the gas port and its replacement; tendency of dust to deposit in the by-pass channel. In spite of these and some operating difficulties, the fuel consumption when the new end was used fell to 110-115 kg/ton in spite of a more rapid firing (up to 33-34 million cal/hour during charging). There are 2 figures and 1 table.

AVAILABLE: Library of Congress
Card 2/2

REYNARU, I.K. [Reinaru, I.]; BELOSHAPKINA, T.A. KICHEVSKAYA, L.S.

Heterohemagglutination reaction in Botkin's disease. Vop.med. virus. no.9:71-76 '64. (MIRA 18:4)

1. Iz Tallinskogo nauchno-issledovatel'skogo instituta epidemiologii, mikrobiologii i gigiyeny i iz Tallinskoy gorodskoy infektsionnoy bol'nitsy.

MEYERSON, F.Z.; LEYKINA, Ye.M.; BELOSHAPKINA, T.D.

Interrelation between the physiological function and genetic apparatus of a cell. Dokl.AN SSSR 149 no.3:700-702 Mr '63. (MIRA 16:4)

1. Institut normal'noy i patologicheskoy fiziologii AMN SSSR. Predstavleno akademikom A.N.Bakulevym.

(Heart--Muscle) (Cell metabolism) (Nucleic acids)

MEYERSON, F.Z.; BELOSHAPKINA, T.D.; LUSHNIKOV Ye.F.; LEYKINA Ye.M.; MARKOVSKAYA, G.I.; CHERNYSHOVA, G.V.

Function, structure and protein metabolism of hypertrophied myocardium. Vestn. Akad. med. nauk SSSR 18 no.[illegible] (MIRA [illegible])

1. Institut normal'noy i patologicheskoy fiziologii AMN SSSR, I Moskovskiy ordena Lenina meditsinskiy institut imeni I.M. Sechenova i Institut eksperimental'noy biologii AMN SSSR.

BELOSHAPKINA, T.S., KULIKOVA L.G., TONGUR, V.S., LEYKINA, E.M. (USSR)

"Synthetic Ribonucleoproteins."

Report presented at the 5th Int'l. Biochemistry Congress, Moscow, 10-16 Aug 1961.

BELOSHAPKO, B.M., VLADIMIROV, B.M., doktor tekhn. nauk, red.;
TIMOFEYEV, Ye.A., red.

[Reducing the breakage in cotton spinning] Sokrashchenie obryvnosti v khlopkoprindenii. Moskva, 1963. [illegible] p.
(MIRA 17:10)

1. Moscow. TSentral'nyy institut nauchno-tekhnicheskoy informatsii legkoy promyshlennosti.

S/137/62/000/003/088/191
A006/A101

AUTHOR: Beloshapko, M.V.

TITLE: Wear of cooled mandrels of piercing mills

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 3, 1962, 39, abstract 3D161 (V sb. "Proiz-vo trub", no. 5, Khar'kov, Metallurgizdat, 1961, 14 - 17)

TEXT: The author analyzes various types of mandrel wear. The basic problem in raising the resistance of cooled mandrels is to eliminate the formation and development of a crack network on their surfaces; this can be achieved by selecting the proper steel grade.

N. Yudina

[Abstracter's note: Complete translation]

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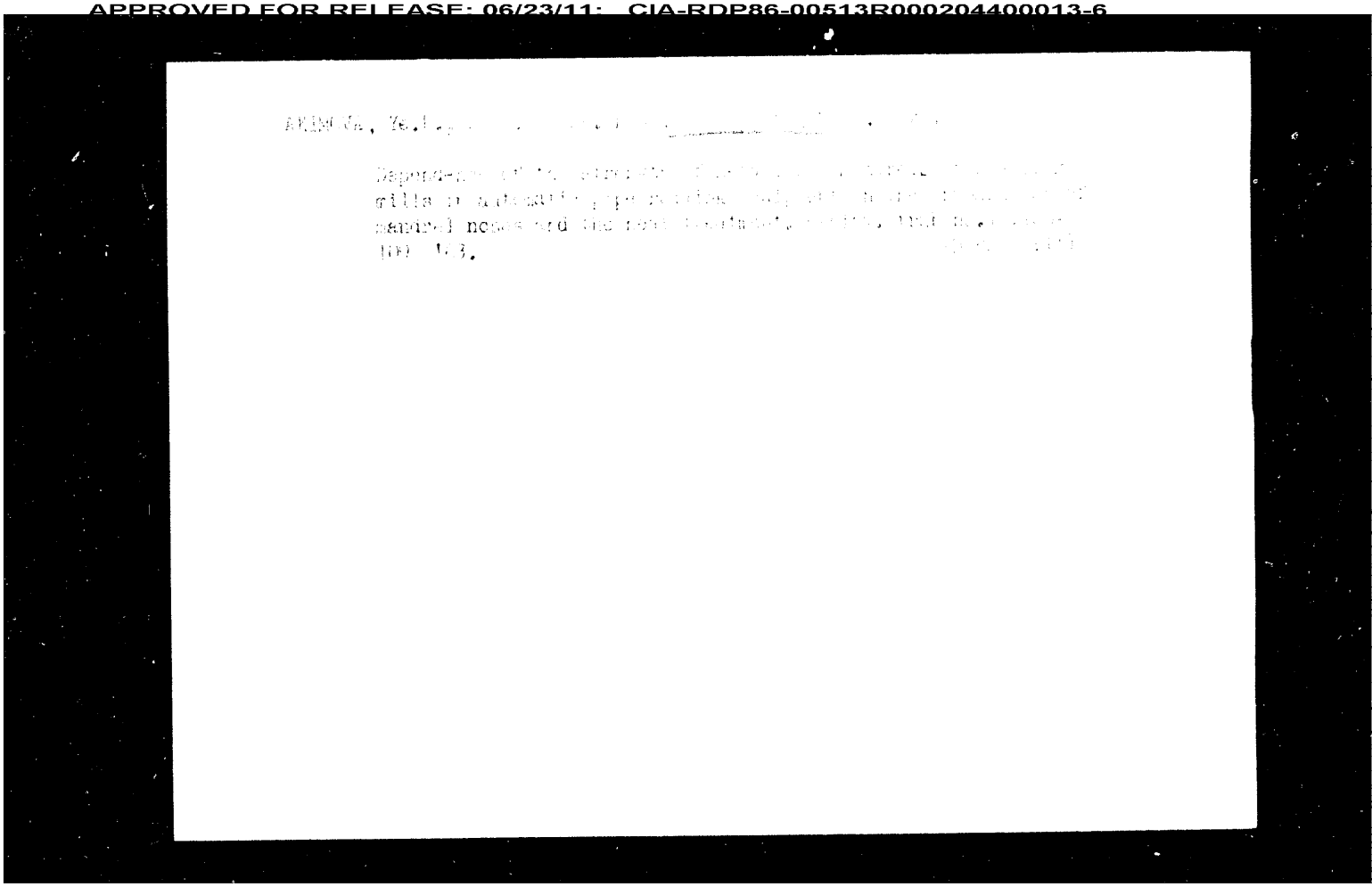

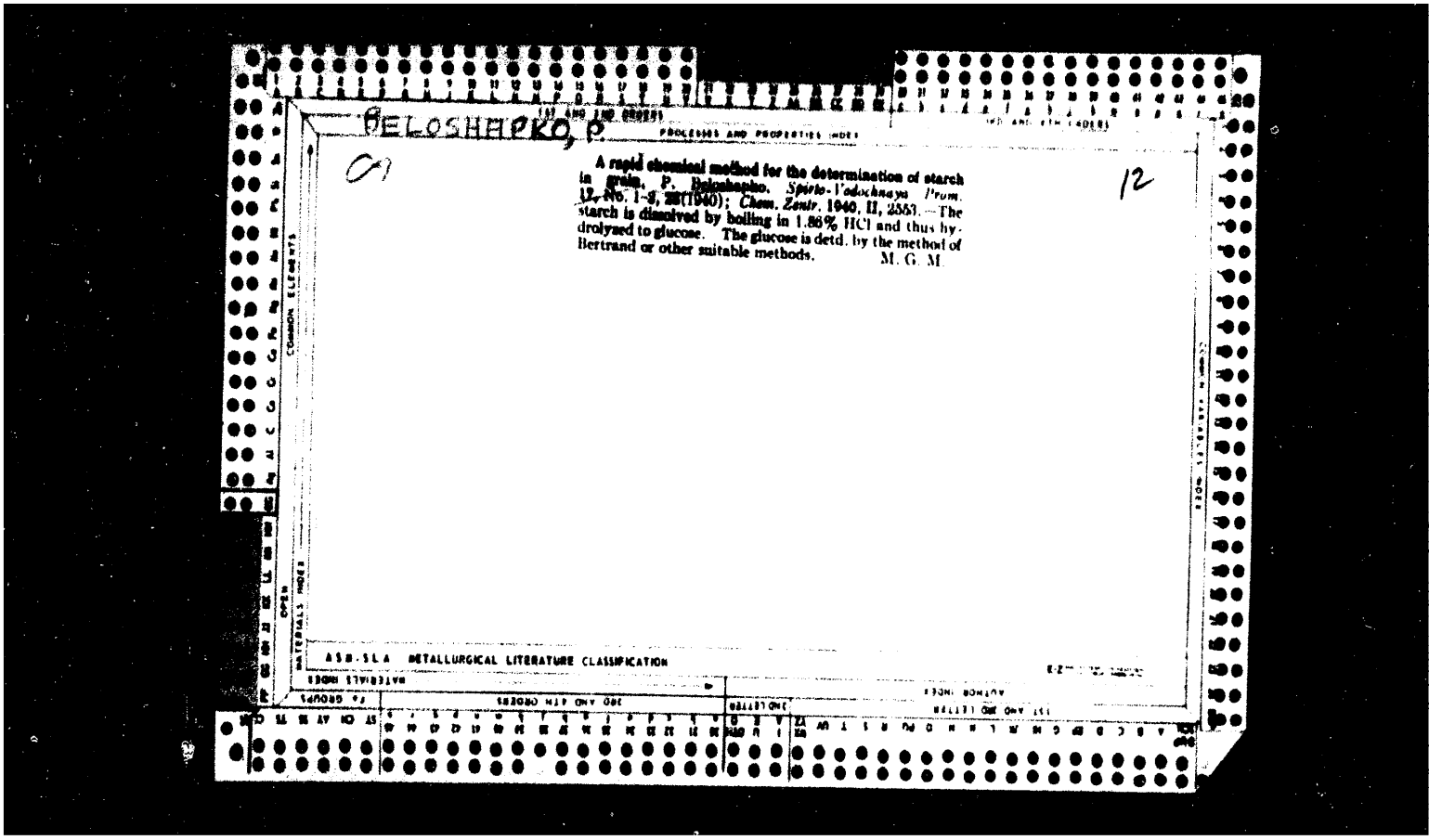

BELOSHAPKO, P.M., mayor med. sluzhby

Pneumatic tamponade of the nose with preservation of nasal respiration
Voen.-med.zhur. no.11:63-64 N '57. (MIRA 11:4)
(NASAL CAVITY,
tamponade with preserv. of nasal resp. (Rus)

L 21530-66

ACC NR: AP6007164 SOURCE CODE: UR/0115/65/000/012/0030/0033

AUTHOR: Beloshapko, V. D.; Kolomnin, V. V.; Rozhdestvenskiy, G. N.; Fedorin, V. P.

ORG: Dolgoprudnensk Machine-Building Plant (Dolgoprudnenskiy mashinostroitel'nyy zavod)

TITLE: Automatic discrete contactless voltmeter for measuring effective values of arbitrary-waveform voltages

SOURCE: Izmeritel'naya tekhnika, no. 12, 1965, 30-33

TOPIC TAGS: voltmeter, digital voltmeter

ABSTRACT: The proposed voltmeter is based on a comparison of the resistances of a T8-S1 thermistor heated by the measurand and by a stepped d-c voltage. The voltages are applied alternately to the thermistor by contactless semiconductor switches. The voltmeter comprises a synchronizer, a thermistor, three semiconductor switches for applying voltages and gating measuring pulses, a pulse extender, two coincidence circuits for determining the error phase, two dividers for enhancing noise elimination, a phase-fixing flip-flop, a control decatron, a 3-digit indicating switch, and a stabilized d-c source. The voltmeter was tested with 200—2000-cps square pulses, and its readings differed from estimated values by 10 mv or less when voltages of 9—10 v were measured. A reading instability of ±10 mv was observed over

Card 1/2 UDC: 621.317.326

L 21530-66
ACC NR: AP6007164

a period of 30 min when a sinusoidal voltage at 25--20,000 cps was measured. Orig. art. has: 3 figures and 4 formulas. [03]

SUB CODE: 09/ SUBM DATE: none/ ORIG REF: 001/ ATD PRESS: 4219

Card 2/2

BELOSHAPKO, V.F., starshiy nauchnyy sotrudnik

Modernization of cotton spinning equipment. Tekst.prom. 19 no.8:51-53 Ag '59. (MIRA 13:1)

1. TSentral'nyy nauchno-issledovatel'skiy institut khlopchatobumazhnoy promyshlennosti.
(Spinning machinery)

VLADIMIROV, Boris Mikhaylovich; BELOSHAPKO, Valerian Fedorovich; ARISTOV, P.I., retsenzent; ZHELEZNYY, A.N., retsenzent; GOLUBEV, N.M., red.; GOLUBKOV, V.A., tekhn. red.

[Over-all modernization of the equipment of cotton-spinning factories] Kompleksnaia modernizatsiia oborudovaniia khlopkopriadil'nykh fabrik. Moskva, Izd-vo nauchno-tekhn. lit-ry RSFSR, 1960. 156 p. (MIRA 14:5)
(Cotton manufacture--Equipment and supplies)
(Spinning machinery)

BELOSHEIN, V.F.

Three-moment equation formulated directly from the loads. Trudy DKHTI no.10:9-15 '60. (MIRA 14:1)
(Mechanics)

BELOSHAPKO, V.F.; KARPOVA, E.V., CHAPANOVA, M.T., [illegible]

Technological [illegible] of the continuous process [illegible] bale-carded sliver at the "Krasnoye Znamia" Cotton Combine in Kamenskoye. Nauch.-issl. trudy TSNIKHBI za 1963 g.:3-24 '64. (MIRA 18:8)

BONDAR, B., arkhitektor; BELOSHEVSKAYA, R. [Biloshevs'ka,R.], inzh.

Cow barn for farms on hillsides. Sil'.bud. 11 no.6:10-12 Je '61.
(MIRA 14:7)

(Ukraine--Dairy barns)

BELOSHEYKOV, A.F.

Distributor of tin cans. Kons. i ov. prom. 16 no.6:19-20 Je '61.
(MIRA 14:8)

1. Konservnyy kombinat v Krymske.
(Tin cans) (Canning and preserving--Equipment and supplies)

BELOSHEYKOV, A. F., inzh.

Our methods of utilizing the tie tamping machine. Put' i put. khoz. 6 no.10:2-5 '62. (MIRA 15:10)

1. Zamestitel' nachal'nika opytnoy putevoy mashinnoy stantsii No. 27 po opytnym rabotam, stantsiya Nagutskaya, Severo-Kavkazskoy dorogi.

(Railroads--Maintenance and repair)

BELOSHEYKOV, A.F.; KLIM, Ya.Ya.

Mechanization of the cutting out of ballast. Put' i put. khoz. 7 no.5:28-29 '63. (MIRA 16:7)

1. Zamestitel' nachal'nika opytnoy putevoy mashinnoy stantsii No.27, stantsiya Mineral'nyye Vody, Severo-Kavkazskoy dorogi (for Beloshеykov). 2. Starshiy inzh. opytnoy putevoy mashinnoy stantsii No.27, stantsiya Mineral'nyye Vody, Severo-Kavkazskoy dorogi (for Klim).
(Ballast (Railroads)--Maintenance and repair)

ISAYEV, A.N.; BELOSHEYKOV, A.F.

New machine for general track overhauling. Put' i put. khoz. 9 no.7:6-8 '65. (MIRA 18:10)

1. Nachal'nik opytnoy putevoy mashinnoy stantsii No.27, stantsiya Armavir, Severo-Kavkazskoy dorogi (for Isayev).
2. Glavnyy mekhanik mashiny VPO-3000, stantsiya Armavir, Severo-Kavkazskoy dorogi (for Belosheykov).

BELOSHITSKIY, P.

During the winter we root out the underbrush. Nauka i pered.op.v sel'khoz. 9 no.1:57 Ja '59. (MIRA 13:3)

1. Glavnyy agronom Katarbeyskoy mashinno-traktornoy stantsii Nizhneudinskogo rayona, Irkutskoy oblasti.
(Clearing of land)

BELOSHITSKIY, P.V. [Bieloshyts'kyi, P.V.]

Simple attachment to the EPP-09 potentiometer for automatic regulation of the body temperature. Fiziol. zhur. [Ukr.] 11 no.1:132-134 Ja-F '65. (MIRA 18:2)

1. Institut fiziologii im. Bogomol'tsa AN UkrSSR, Kiyev.

L 11371-67 EWT(1) SCTB DD/GD

ACC NR: AT6036494 SOURCE CODE: UR/0000/66/000/000/0059/0060

25

AUTHOR: Beloshitskiy, P. V.

ORG: none

TITLE: Increased resistance of animals to decompression under conditions of hypothermia [Paper presented at conference on problems of space medicine held in Moscow from 24-27 May 1966]

SOURCE: Konferentsiya po problemam kosmicheskoy meditsiny, 1966. Problemy kosmicheskoy meditsiny. (Problems of space medicine); materialy konferentsii, Moscow, 1966, 59-60

TOPIC TAGS: hypothermia, decompression sickness, decompression resistance, animal physiology, space physiology

ABSTRACT:

The increased resistance to decompression of animals subjected to hypothermia is known [Corey, Lewis (1950), Hall, Corey (1950), Ye. A. Kovalenko, V. I. Korol'kova, Ye. A. Il'ina (1963), and others]. However, many questions of the mechanism of this effect remain unclear.

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ACC NR: AT6036494

Two series of experiments were conducted on 40 white rats. In the first series, the animals (20 rats) were subjected to decompression at normal body temperature, while rats of the second series were first cooled to 22 ± 1°C in a specially designed temperature chamber in which cooling of the animal to the required temperature and, if necessary, maintenance at that temperature, were automated.

Series I: the rats were immobilized and sensors for recording EKGs, temperature, pulse frequency, respiration, and brain oxygen tension were installed; the rats were then placed in a small pressure chamber communicating with a larger chamber containing rarefied air equivalent to an altitude of 15800 m. Pressure in the two chambers was equalized 25 sec after the communicating valve was opened. The animals remained at this "altitude" for 1.5 min, after which normal pressure was restored in the chamber over a period of approximately 1 min. All of the above mentioned were continuously recorded throughout the experiment.

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ACC NR: AT6036494

In the first minute after decompression to an "altitude" of 15800 m, heartbeat slowed sharply to 17 ± 5 beats/10 sec against 70 ± 7 (normal) in the animals which later died and to 12 ± 5 beats/10 sec against 65 ± 4 (normal) in the rats which survived. Respiration also slowed sharply or stopped completely, but resumed following recompression in some rats and returned almost to normal within 5 min. It should be noted that the final movement of the rib cage took place 139 ± 13 sec and the final cardiac contraction 621 ± 120 sec after the onset of decompression.

During decompression, the rib cage expanded, and exhalation required greater physical effort than inhalation.

The EKG's showed bradycardia, arrythmia, increased QRS voltage, lengthening of the TQ and QRS intervals, and elevation of the ST sector (often higher than the QRS). Oxygen tension in brain tissues dropped considerably, reaching the minimum value 2.2 to 3.2 min after the onset of decompression.

Series II: pulse frequency and respiration frequency in rats subjected to hypothermia were 21 ± 2/10 sec and 24 ± 5/30 sec respectively; one minute after decompression, these values were 5 ± 2/10 sec and

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ACC NR: AT6036494

0

9 ± 6/30 sec. In the animals which died, respiration usually ceased first. Thus, the final movement of the rib cage occurred after 420 ± 111 sec while heartbeat stopped 940 ± 159 sec after onset of decompression.

On the EKG's, arrythmia, bunching of cardiac contractions, and sometimes a negative P spike were seen in addition to the changes characteristic of animals in hypothermia. Oxygen tension in brain tissues decreased more gradually, reaching the minimum value 2.4 to 4.2 min after onset of decompression, i.e., even after recompression.

Thus, in the animals subjected to hypothermia, the decrease in brain oxygen tension was less severe and changes in respiration and heartbeat less pronounced, i.e., the tissues remain unaffected by oxygen starvation for a longer time.

It is possible that hypothermia also weakens the flow of impulsation coming primarily from the expanded rib cage and abdominal cavity, thereby reducing the probability of reflex respiratory stoppage.

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Evidently all these characteristics of animals subjected to hypothermia tend to increase their survival. Thus, 14 of the 20 control rats died after decompression, compared to 5 of the 20 rats subjected to hypothermia; that is to say, the survival rate increased three-fold.

[W.A. No. 22; ATD Report 66-116]

SUB CODE: 06 / SUBM DATE: 00May66

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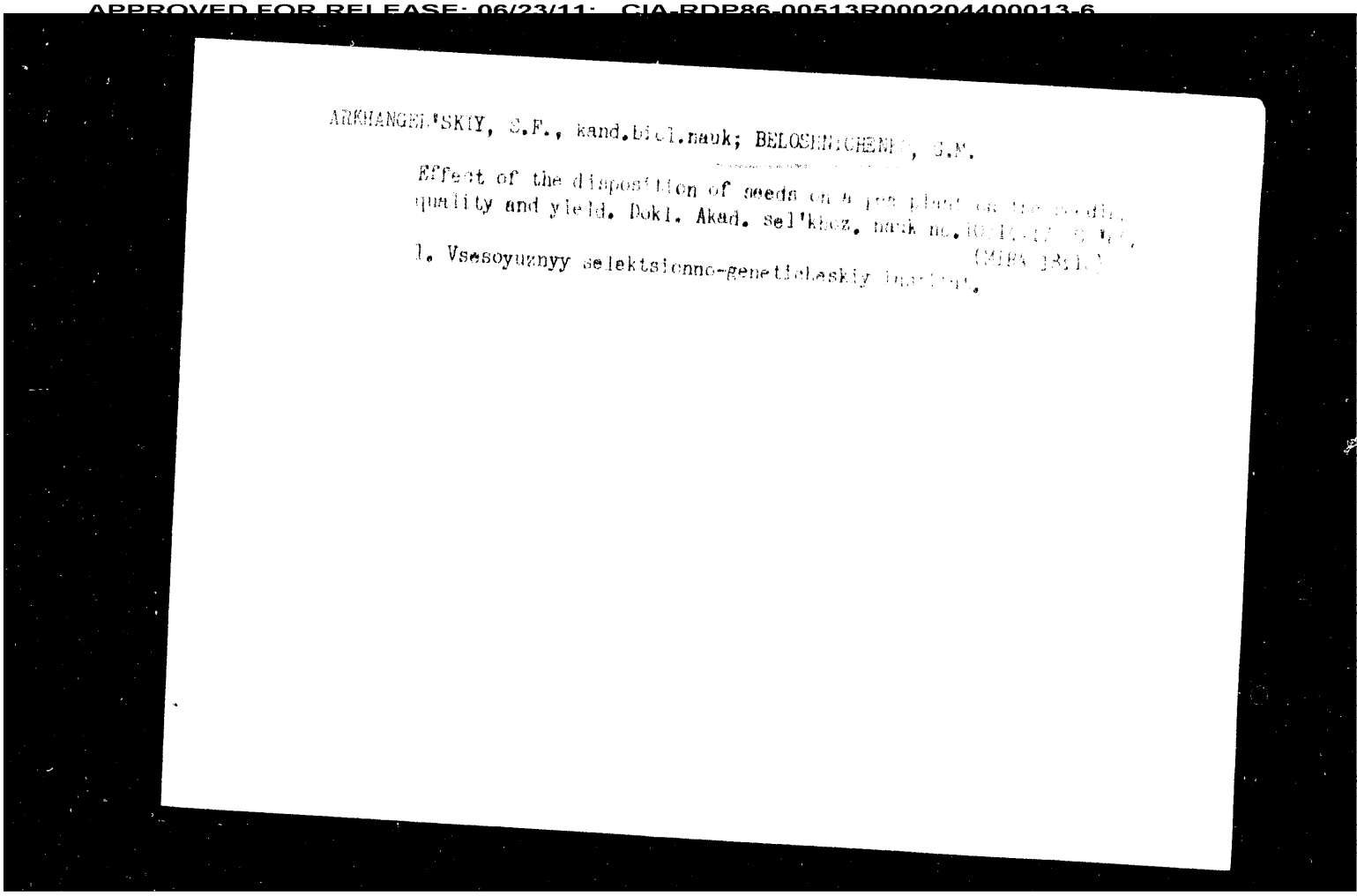

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